Context-Aware Support for Communities of Practice

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Abstract

This poster concerns the need for software engineering support in providing Context-Aware solutions for Communities of Practice (CoP). We illustrate the use of an agent-oriented modeling language (AORML) for analyzing the contextual information and interactions between participating actors in a context-aware services platform. AORML is a UML-based language specifically tailored for agent-oriented systems analysis and design, and it has already been illustrated in previous work related to Distributed Knowledge Management. The chosen supporting platform is the WASP Platform (Web Architectures for Services Platforms), a Web services-based context-aware platform that runs on top of 3G networks.

1 Introduction

In this work, we discuss a context-aware approach for supporting Communities of Practice (CoPs). CoPs are today an established concept in the Knowledge Management theory, and have also been applied in practice in many organizational settings [Guizzardi et al, 2004]. Moreover, Context-Aware computing deals with the ability of computer systems to take advantage of information from or the conditions in the user's dynamic environment to provide services or to execute tasks. In section 2, we exemplify the use of Agent-Object-Relationship Modeling language in the analysis of a specific context, given by a fictitious scenario, inspired in the available literature regarding health care systems and ubiquitous computing [Konstantas, 2004]. The example uses WASP platform as the supporting context-aware services platform. Finally, section 3 concludes this poster.

2 Context-Aware modeling using AORML in WASP platform

The WASP project [Costa, 2003] is concerned with the definition and validation of a services platform to facilitate the development and deployment of context-aware applications on top of 3G networks using Web Services infrastructures. The platform allows client application to subscribe to services made available in the platform by *Service Providers* that use contextual information provided by *Context Providers*. This feature brings flexibility since services can be offered without having to change the platform, and contextual information can be programmatically added through an API. This is the main reason why we chose to use the WASP Platform in the work described here. The main components of the WASP platform are: (*i*) *Context Interpreter* that gathers contextual information from *Context Providers,* manipulates the contextual information and makes it uniformly available to the platform; (*ii) Monitor*, responsible for interpreting and managing client application's subscriptions; and (*iii) Service Manager* that provides semantic service-oriented capabilities to the platform such as service description publishing, service discover and selection, service composition and service execution.

The following scenario description uses this platform: "The ABC hospital management supports the Distributed Knowledge Management approach, sponsoring the development of Communities of Practice (CoPs) across the hospital units. These communities are self-organizing groups whose members share interests and goals, or perform similar tasks within the hospital. Thus, their members are not necessarily from the same working team or unit. In this setting, new communities naturally emerge, and the management fostered their initial configuration as follows: i) first, the CoPs have been organized reflecting the division of medical specialties, e.g., cardiology, neurology, among others; and then, ii) an extension of the WASP context-aware services platform began supporting the emergence of new CoPs, based on interactions between members of each unit. Using this new platform, the communities' members fill in their profiles and interact with each other by sending e-mails, submitting comments to newsgroups and using instant messaging. The members' profiles along with the information over their inter-

actions, considered here as contextual information, are analyzed by services available on the platform, which identify related interests, cognitive and social characteristics for creating new CoPs."

2.1 Modeling with AORML

AORML supports context analysis using the AOR external model, which starts with the Agent Diagram. Figure 1 presents an agent diagram, depicting the active entities (agents) of the described scenario. The agents can be artificial, human or institutional agents, as shown in Fig. 1, using UML stereotypes on top of the rounded-box representing each agent. Table 1 summarizes the description of each agent in Fig.1

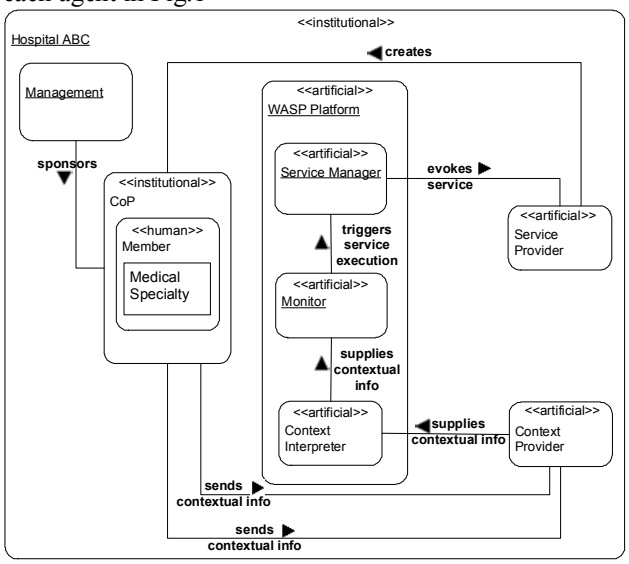

Figure 1 - Scenario modeled using AORML Agent Diagram

A concrete example of the proposed platform use is the following: Ronald, a cardio-vascular surgeon exchange e-mails with Sanny, a plastic surgeon, about the implications of a particular plastic surgery procedure in cardio-vascular condition. Although they are from different medical specialties, thus from different initial CoPs, they are married (social characteristic) and share common professional interests. The platform receives some contextual information (e.g., personal data from the users' profiles showing Ronald and Sanny are married) from Context Providers. This contextual information represents the triggering condition necessary for the execution of a service to evaluate the requirements for creating a new CoP that encompasses the involved interests. Other possible artifacts in this setting that support the elicitation of contextual information are: emails between hospital members, from which personal shared interests may be extracted, published CVs from the hospital staff, and medical specialists filled form about special health conditions or patients.

3 Conclusions

In this poster, we presented an AORML model of a particular health care scenario using a context-aware services platform. Due to space limitations, the presentation of our analysis results has been simplified here. For further references for the WASP project and AORML case studies we refer you to the following web sites: http://www.freeband.nl/projecten/wasp/ENindex.html and http://tmitwww.tm.tue.nl/staff/gwagner/AORML/, respectively.

Table 1 – Agent's summarized descriptions

Agent	Description
Hospital ABC	Represents the organization where the *CoP*s are developed in our scenario. All other agents are placed within this one, i.e. the humans and artificial agents that support *CoP*s on behalf of the organization.
CoP	Represents the communities of practice created within and across the units of the *Hospital ABC*.
Management	Fosters *CoP*s within the *Hospital ABC*.
Medical Specialty	Serve as basis for the creation of the first *CoP*s.
Member	The participants of the *CoP*s and also the actual users of the *WASP Platform*. The information about their interests, cognitive and social characteristics composes their *profile* locally stored in their specific *units*.
WASP Platform	Proposed platform to support context-aware services.
Monitor	WASP internal agent responsible for: a) managing the contextual information received by the Context Interpreter; b) triggering services execution once a triggering condition is matched.
Context Interpreter	WASP internal agent that receives contextual information from Context Providers and puts this information in the standard WASP format. The input contextual information may be in various protocols, configurable in the WASP Platform.
Service Provider	Offer their services by registering the services description to the platform
Context Provider	Provides contextual information gathered by sensors or third party context providers

References

[Costa, 2003] P. D. Costa. *Towards a Services Platform for Context-Aware Applications*. Master Thesis, University of Twente, The Netherlands, 2003.

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[Konstantas, 2004] Usign UMTS in Emergency Health Care, In: Mobile Solutions 2004, The Netherlands, April 2004.